Knowledge and attitude of donating and using cord blood for transfusion among patients attending Nnamdi Azikiwe University Teaching Hospital, Nnewi, South East Nigeria

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Abstract:

BACKGROUND: Allogeneic blood for transfusion is in short supply in most parts of the developing world. Cord blood for transfusion can be a significant source of blood supply to our health institutions.

AIMS: This study aims to investigate the knowledge and attitude to the donation and use of umbilical cord blood (UCB) for transfusion among the patients receiving services in a tertiary health institution in South-East Nigeria.

MATERIALS AND METHODS: This was a cross-sectional study; an anonymous structured questionnaire was used. A total of 549 consenting patients randomly selected from the antenatal, postnatal, sickle cell clinics, and wards were the subjects. Statistical analysis of the data was done using SPSS version 20.0.

RESULTS: The mean age of the participants was 31.9 ± 9.5 years. The majority were females (77.2%), married (86.4%). About 26.2% of the respondents were willing to accept UCB for transfusion to them or their child. Following counseling, the acceptance rate increased to 71.5%. Most of the respondents (80.0%) were willing to donate the UCB of their baby; or be tested for HIV (93.3%), if necessary. Educational level was significantly associated with knowledge of UCB. After logistic regression, occupation, and gender were significantly associated with acceptance of UCB for transfusion. Up to 52% belonged to low income family background, approximately 150 US dollars monthly family income (50,000 naira).

CONCLUSION: The knowledge and acceptance of UCB for transfusion are low in our environment. However, proper counseling and public enlightenment could change this attitude.

Keywords:

Acceptance, attitude, knowledge, Nigeria, transfusion, umbilical cord blood

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Introduction

Cord blood is the blood that is contained in the umbilical cord and placenta removed from a mother after the baby is delivered, it is rich in stem cells. In time past, this was thrown away as waste. However, in this era of cost containment and wiser use of medical resources, cord blood has been found to be very useful both for transplantation, as in sickle cell disease (SCD).[1] and for transfusion.[2] In fact, transfused stem cells in umbilical cord blood (UCB) have been found quite useful in repairing damaged tissue in the cardiovascular and central nervous systems.[3,4] Other advantages of using UCB for transfusion include low risk

of viral infection, no risk to donor or donor attrition and immediate availability.[5] In Nigeria, as in many developing countries, transplantation medicine is still in rudimentary stages; and procurement of allogeneic blood for transfusion is low compared to need for the same.[6,7]

Cord blood for transfusion is a viable alternative to allogeneic blood and can potentially be an added source of blood supply for our national need if properly harnessed. This is made more imperative by the paucity of altruistic (voluntary) blood donors coupled with the reported high prevalence of transfusion-transmissible infections among both allogeneic blood donors and the general population in most developing countries, including Nigeria.[8-10] In West Africa, Ghana is in the forefront of mobilizing this resource.[2] In Nigeria, attitudes and cultural beliefs about the placenta and umbilical cord may make it difficult or impossible to harness this resource. Hence, we set out in this work to assess the knowledge and attitude of potential donors – antenatal and postnatal patients - and recipients - SCD and other patients - in our hospital. To the best of our knowledge, we are the first to look at knowledge and attitude toward UCB for transfusion from the perspective of both donors and recipients in our clime.

Materials and Methods

This cross-sectional study was carried out in Nnamdi Azikiwe University Teaching Hospital that is in the South East of Nigeria and serves parts of the surrounding states of Delta, Imo, Enugu and Abia States. An anonymous structured questionnaire was the research tool that was used. This tool was developed after focused discussion among a group of clinicians who have worked in the cultural setting where the tool was to be applied and understood the cultural issues as it affected the patients. The questionnaire was piloted among 15 individuals from diverse socioeconomic settings and minor changes made. The parts of the questionnaire that needed to be translated into the respondents' language (usually Ibo) were transcribed and verified.

The questionnaire was applied to 549 patients who were approached randomly, as they waited to see the doctor in the antenatal, postnatal, sickle cell clinics, and wards in our hospital. The questionnaire consisted of three parts. The first dealt with the sociodemographics of the patients such as age, sex, occupation, and profession. The second part examined knowledge concerning the umbilical cord and placenta blood, what they were, their donation and use in transfusion. The third part focused on attitude toward donation and use of cord blood for transfusion. Respondents were asked if they were willing to accept UCB for their child or themselves as well as

donate their child's UCB. Concise information was given to the respondents on what UCB was and the advantages of its use in transfusion. The attitude of the respondent was explored before and after this information; to assess whether it would change.

The reasons for which respondents would accept or reject UCB for themselves or their children or donate their child's UCB were categorized as follows: Hygiene – those that had to do with the unhygienic nature of the after birth process; save live – those that had to do with desire to save life; knowledge – those that had to do with knowledge or the lack of it, concerning UCB transfusion; faith – those that had to do with religious beliefs; doctor's prescription – those that alluded to the doctor's advice as final; traditional beliefs – those that had to do with superstition and traditional beliefs; waste – those that pointed to the placenta as a waste product and personal – those that refused to give any reason or gave personal reasons.

The respondents, depending on their level of education, filled the questionnaire either by themselves or with assistance from the field worker trained to apply the instrument. This assistance sometimes included translating some questions into the respondents own native language. Verbal consent was taken from the patient while ethical approval for the study was given by the ethics committee of our hospital.

The details of respondents (particularly sociodemographic information) in the administered questionnaire were not returned 100%, therefore those items that were missing were excluded in the final analysis. Data from the questionnaires were statistically analyzed using SPSS version 20.0 (SPSS Inc., Chicago, IL, USA). Univariate analyses were carried out and relevant frequencies and proportions calculated. Bivariate analyses to determine any differences between groups were done using contingency tables. These differences, as well as the associations between variables, were tested for statistical significance (set at a $P < 0.05$) using Chi-squared and Fisher's exact tests. Those that reached statistical significance were further subjected to multivariate logistic regression analysis to determine their independent effects on other variables. Adjusted odds ratios (ORs) and 95% confidence intervals (CIs) were calculated for the associations.

Results

Table 1 shows the distribution of the sociodemographic characteristics of the respondents. The study participants had a mean age of 31.9 ± 9.5 years. About half of them were in the 21–30 years age group (49.7%). The majority of them were females (77.2%), married (86.4%), and of

the orthodox religious denomination (62.8%). Traders formed the largest occupational group (34.6%). More than half of the respondents (52%) had an average family income of <50,000 naira (250 dollars) per month. The majority had 1 to 3 children (48.9%).

Only 294 respondents (54.7%) knew what cord blood was (χ^2 = 4.844, P = 0.028), out of which 87 (31.2%) knew if cord blood could be used for transfusion (χ^2 = 39.516, $P \leq$ 0.0001). When asked the question, "Do you know what happens to the placenta after delivery?" 365 (67.6%) answered "yes" while 175 (32.4%) answered "no." This difference was statistically significant (χ^2 = 66.852, $P \leq$ 0.0001).

Table 2 shows the participants' acceptance of UCB transfusion before and after counseling. Before counseling, 140 respondents (26.2%) were willing to accept UCB transfusion for their child or themselves. This number increased to 373 (71.5%) after the respondents were counseled. Among the reasons proffered for willingness to accept UCB by the respondents, knowledge and personal reasons had the highest proportions before counseling (38.6% and 31.2%) and after counseling (39.1% and 35.6%, respectively).

More respondents were willing to allow the UCB of their child to be given to someone who needed it compared to those unwilling (433 respondents, 80.0% vs. 103 respondents, 19.2%). This was statistically significant at the 5% confidence level with a χ^2 of 2003.172 and a $P <$ 0.0001. Their willingness was based on wanting to save lives (57.8%), personal reasons (26.5%), and avoidance of waste (12.7%) among others. All 34 respondents who had a child with SCD were willing to accept UCB for their child or themselves if it could cure SCD. They made up 6.2% of the study sample. The female respondents were asked about their willingness to undergo HIV testing as a requirement for donating UCB. Three hundred and seventy-one (93.9%) answered yes while 24 (6.1%) answered no (χ^2 = 304.833, $P \leq$ 0.0001).

Tables 3-5 show bivariate analysis carried out to assess the associations between the participants' sociodemographic characteristics and their knowledge and attitude to UCB transfusion. The results showed that level of education was significantly associated with knowledge about UCB (χ^2 = 8.549, P = 0.014), as was average family income (χ^2 = 12.239, P = 0.007). The mean age of respondents was significantly different between who knew or did not know the outcome of the placenta postdelivery (t = 3.151, P = 0.002). In addition, the knowledge of the outcome of the placenta differed significantly by age of respondent (χ^2 = 13.701, P = 0.008), marital status (χ^2 = 7.594, P = 0.006), and number of children (χ^2 = 30.011, P = 0.000).

Table 1: Distribution of sociodemographic variables

Sociodemographic variable	Number	Percentage
Age in years (*n*=535)		
≤20	26	4.9
21-30	266	49.7
31-40	190	35.5
41-50	18	3.4
≥50	35	6.5
Mean±Standard deviation =31.85±9.51 years		
Gender (*n*=543)		
Male	124	22.8
Female	419	77.2
Occupation (*n*=535)		
Professionals	80	15.0
Traders	185	34.6
Artisans	54	10.1
Civil servants	56	10.4
Clergy	4	0.7
Students	99	18.5
Unemployed	57	10.7
Average family income (*n*=465)		
< 50,000 naira	242	52.0
50,000100,000 naira	137	29.5
100,000200,000 naira	57	12.3
> 300,000 naira	29	6.2
Religious denomination (*n*=541)		
Orthodox	340	62.8
Pentecostal	161	29.8
Jehovah's witnesses	2	0.4
Islam	5	0.9
Non-orthodox, non-pentecostal	31	5.7
Pagan	2	0.4
Marital status (*n*=544)		
Married	470	86.4
Single	74	13.6
Level of education (*n*=538)		
Primary	38	7.1
Secondary	241	44.8
Tertiary	259	48.1
Number of children (*n*=546)		
None	191	35.0
1-3	267	48.9
4-6	79	14.5
≥7	9	1.6

With regard to attitude to UCB transfusion, a statistically significant association was found between the respondents' religion and their willingness to accept UCB transfusion before counseling (χ^2 = 12.254, P = 0.031). On the other hand, gender and respondents' occupation were significantly associated with their willingness to accept UCB transfusion after they were counseled. While gender and marital status was significantly associated with respondents' willingness to allow the UCB of their child to be given to someone else in need of it, that with marital status was marginal (for

Table 2: Effect of counselling on acceptability of umbilical cord blood transfusion

Variable	Number (%)	χ^2	P
Respondents willingness to accept cord blood transfusion for their child or themselves			
Before counselling			
Yes	140 (26.2)	120.816	0.000*
No	394 (73.8)		
After counselling			
Yes	373 (71.5)	96.123	0.000*
No	149 (28.5)		
Comparing responses before and after counselling		58.909	0.000*
Reasons for being willing to accept cord blood transfusion		122.711	0.000*
Before counselling			
Hygiene	88 (16.4)		
To save life	55 (10.3)		
Knowledge	207 (38.6)		
Personal reasons	167 (31.2)		
Faith	6 (1.1)		
Doctor's prescription	13 (2.4)		
After counselling			
Doctor's prescription	20 (3.8)		
Faith	13 (2.4)		
Knowledge	208 (39.1)		
Personal reasons	189 (35.6)		
To save life	79 (14.9)		
Hygiene	19 (3.6)		

*Statistically significant (P<0.05)

gender, $\chi^2 = 7.804$, $P = 0.005$; for marital status $\chi^2 = 3.966$, $P = 0.046$).

The sociodemographic variables that had statistically significant associations with knowledge and attitude to UCB transfusion were subjected to logistic regression analysis to determine if each had independent effects on the outcome variables while holding other variables constant. Gender and level of education no longer achieved statistical significance in their association with knowledge of blood transfusion. However, having at least secondary school education was significantly associated with having knowledge of UCB on multivariate analysis (adjusted OR = 2.167, 95% CI = 1.007–4664). Although the logistic regression model $P = 0.012$ was attenuated from 0.007 obtained from univariate analysis, having an average family income of more than 50,000 naira was still significantly associated with having knowledge of UCB. The 95% CIs of the income categories do not include the null value except for incomes higher than 300,000 naira. Age and marital status were independently associated with knowledge of the outcome of the placenta postdelivery. The odds of knowing the outcome of the placenta postdelivery among single respondents was 1.738 relative to the married respondents (95% CI = 1.033–2.924).

Table 3: Association between respondents' sociodemographic characteristics and their knowledge of what umbilical cord blood is

Sociodemographic variable	Knowledge of umbilical cord blood		χ^2	P
	Yes	No		
Age of respondent (years) (*n*=526)				
≤20	11 (44.0)	14 (56.0)	3.549	0.471
21-30	146 (55.5)	117 (44.5)		
31-40	101 (54.0)	86 (46.0)		
41-50	9 (52.9)	8 (47.1)		
≥50	23 (67.6)	11 (32.4)		
Gender (*n*=534)				
Male	71 (58.7)	50 (41.3)	1.008	0.315
Female	221 (53.5)	192 (46.5)		
Occupation (*n*=526)				
Professionals	47 (59.5)	32 (40.5)	3.074	0.800
Traders	92 (50.8)	89 (49.2)		
Artisans	33 (61.1)	21 (38.9)		
Civil servants	30 (54.5)	25 (45.5)		
Students	51 (52.0)	47 (48.0)		
Unemployed	31 (56.4)	24 (43.6)		
Clergy	2 (50.0)	2 (50.0)		
Average family income (*n*=458)				
<50,000	119 (50.0)	119 (50.0)	12.239	0.007*
50,000-100,000	88 (64.7)	48 (35.3)		
>100,000-200,000	39 (69.6)	17 (30.4)		
>300,000	14 (50.0)	14 (50.0)		
Religion (*n*=533)				
Orthodox	176 (53.0)	156 (47.0)	5.525	0.355
Pentecostal	90 (55.9)	71 (44.1)		
Jehovah's witnesses	1 (50.0)	1 (50.0)		
Islam	4 (80.0)	1 (20.0)		
Non-orthodox, non-Pentecostal	20 (64.5)	11 (35.5)		
Pagan	2 (100.0)	0 (0.0)		
Marital Status (*n*=535)				
Married	258 (55.8)	204 (44.2)	1.588	0.208
Single	35 (47.9)	38 (52.1)		
Level of education				
Primary	24 (63.2)	14 (36.8)		
Secondary	112 (47.5)	124 (52.5)		
Tertiary	152 (59.6)	103 (40.4)		
Number of children (*n*=537)				
None	99 (53.2)	87 (46.8)	6.952	0.073
1-3	138 (51.9)	128 (48.1)		
4-6	50 (65.8)	26 (34.2)		
≥7	7 (77.8)	2 (22.2)		

χ^2=Chi-squared, *P<0.05

The regression analysis also showed that religion does not have a statistically significant association with respondents' willingness to accept cord blood for their child or themselves, before counseling although pentecostal respondents and nonorthodox, nonpentecostal respondents were 1.3 times and 2.6 times more likely to be willing compared to orthodox

respondents. However, after counseling, gender and occupation showed statistically significant associations on multivariate logistic analysis. Females were 1.9 times more willing to accept cord blood for their child or

Table 4: Association between respondents' sociodemographic characteristics and their knowledge of the outcome of the placenta post-delivery

Sociodemographic variable	Knowledge of outcome of placenta post-delivery		χ^2	P
	Yes	**No**		
Age of respondent (years) (*n*=529)				
≤20	10 (40.0)	15 (60.0)	13.701	0.008*
21-30	176 (66.2)	90 (33.8)		
31-40	128 (69.2)	57 (30.8)		
41-50	14 (77.8)	4 (22.2)		
≥50	29 (82.9)	6 (17.1)		
Gender (*n*=537)				
Male	78 (63.4)	45 (36.6)	1.160	0.281
Female	284 (68.6)	130 (31.4)		
Occupation (*n*=529)				
Professionals	54 (68.4)	25 (31.6)	4.438	0.618
Traders	121 (66.5)	61 (33.5)		
Artisans	39 (72.2)	15 (27.8)		
Civil servants	37 (66.1)	19 (33.9)		
Students	61 (61.6)	38 (38.4)		
Unemployed	42 (76.4)	13 (23.6)		
Clergy	3 (75.0)	1 (25.0)		
Average family income (*n*=462)				
<50,000	147 (61.5)	92 (38.5)	6.127	0.106
50,000-100,000	99 (72.3)	38 (27.7)		
>100,000-200,000	42 (73.7)	15 (26.3)		
>300,000	20 (69.0)	9 (31.0)		
Religion (*n*=536)				
Orthodox	227 (67.4)	110 (32.6)	3.638	0.603
Pentecostal	110 (69.2)	49 (30.8)		
Jehovah's witnesses	1 (50.0)	1 (50.0)		
Islam	4 (80.0)	1 (20.0)		
Non-orthodox, non-Pentecostal	18 (58.1)	13 (41.9)		
Pagan	2 (100.0)	0 (0.0)		
Marital status (*n*=538)				
Married	324 (69.7)	141 (30.3)	7.594	0.006*
Single	39 (53.4)	34 (46.6)		
Level of education (*n*=533)				
Primary	26 (68.4)	12 (31.6)	0.580	0.748
Secondary	156 (65.8)	81 (34.2)		
Tertiary	178 (69.0)	80 (31.0)		
Number of children (*n*=540)				
None	104 (55.3)	84 (44.7)	30.011	0.000*
1-3	188 (70.7)	78 (29.3)		
4-6	64 (83.1)	13 (16.9)		
≥7	9 (100.0)	0 (0.0)		

χ^2=Chi-squared test statistic, *P<0.05

themselves after counseling (adjusted OR = 1.925, 95% CI = 1.155–3.210, P = 0.012).

Discussion

Blood, with its vital cellular and plasma components, is very essential for the survival of humans. Medical practitioners at different times have tried different things to make this fluid available to meet human needs, ranging from transfusing animal blood into humans to trying to synthesize blood in the laboratory. These efforts have failed and blood still remains a fluid that is very much limited in supply. This is particularly so in Africa as a whole and Nigeria specifically where socioeconomic and cultural factors make it difficult for individuals to voluntarily donate blood to meet medical needs.[6,7] With our blood supply in this precarious position, it becomes important to reexamine how we use the placenta, which is normally discarded as useless.

The placenta contains blood which is rich in stem cells and can be used for transplantation and transfusion. The use of UCB was initially met with doubt and skepticism with regards to whether it contains optimal numbers of stem cells to adequately repopulate the marrow, following myeloablation, interestingly, this has changed in the last couple of years.[11] Evidence exist which suggest that not only does UCB used for transfusion replace peripheral blood cells and plasma, the stem cells which it contains can also be therapeutic.[3,4,12,13] Hence, it becomes extremely important to harness this resource in our clime.

We found that although a lot of our respondents (55.7%) knew what cord blood was, and 67.6% claimed to know what happened to the placenta after birth, only a few (15.8%) knew that UCB could be used for transfusion. This was statistically significant ($P \leq 0.0001$). Furthermore, although, 80% of our respondents would voluntarily give out the placenta of their children, mainly for the altruistic reason of wanting to be part of saving other lives, very few (26.2%) were willing to accept for themselves or their children to be transfused with UCB. However, after counseling, this increased to 71.5%, which was statistically significant ($P \leq 0.0001$). The main reason for this change was an appreciation of the facts concerning UCB for transfusion. A similar study done in a population of 5120 Chinese women, showed that 73.3% of mothers were willing to donate their UCB for transfusion, the frequency was higher in study subjects with masters or college degrees or those having better occupations (72.5% and 71.1%, respectively).[14]

These figures were close to the findings of Hassall *et al.* who worked with postnatal women in Mombasa, Kenya. UCB donation and transfusion were acceptable to 81% and 78% of these women, respectively.[15] Similarly,

Table 5: Association between respondents' sociodemographic characteristics and their willingness to allow the use of their child's umbilical cord blood

Sociodemographic characteristic	Willingness to allow the umbilical cord blood of their child to be given to someone else in need of it		χ^2	P
	Yes	No		
Age of respondent (years) (*n*=525)				
≤20	20 (76.9)	6 (23.1)	6.284	0.179
21-30	206 (79.2)	54 (20.8)		
31-40	152 (81.3)	35 (18.7)		
41-50	17 (94.4)	1 (5.6)		
≥50	31 (91.2)	3 (8.8)		
Gender (*n*=534)				
Male	110 (89.4)	13 (10.6)	7.804	0.005*
Female	321 (78.1)	90 (21.9)		
Occupation (*n*=525)				
Professionals	65 (82.3)	14 (17.7)	4.153	0.656
Traders	146 (81.1)	34 (18.9)		
Artisans	44 (84.6)	8 (15.4)		
Civil servants	47 (85.5)	8 (14.5)		
Students	78 (79.6)	20 (20.4)		
Unemployed	43 (75.4)	14 (24.6)		
Clergy	4 (100.0)	0 (0.0)		
Average family income (*n*=456)				
<50,000	194 (82.6)	41 (17.4)	4.041	0.257
50,000-100,000	109 (80.7)	26 (19.3)		
>100,000-200,000	50 (87.7)	7 (12.3)		
>300,000	27 (93.1)	2 (6.9)		
Religion (*n*=531)				
Orthodox	280 (83.1)	57 (16.9)	8.918	0.112
Pentecostal	121 (78.1)	34 (21.9)		
Jehovah's Witnesses	0 (0.0)	1 (100.0)		
Islam	3 (60.0)	2 (40.0)		
Non-orthodox, Non- Pentecostal	22 (71.0)	9 (29.0)		
Pagan	2 9100.0)	0 (0.0)		
Marital Status (*n*=534)				
Married	365 (79.3)	95 (20.7)	3.966	0.046*
Single	66 (89.2)	8 (10.8)		
Level of education (*n*=528)				
Primary	33 (89.2)	4 (10.8)	1.848	0.397
Secondary	189 (80.1)	47 (19.9)		
Tertiary	204 (80.0)	51 (20.0)		
Number of children (*n*=536)				
None	156 (82.1)	34 (17.9)	0.365	0.947
1-3	209 (80.1)	52 (19.9)		
4-6	61 (80.3)	15 (19.7)		
≥7	7 (77.8)	2 (22.2)		

χ^2=Chi-squared test statistic, *P<0.05

Wagner *et al.* reported an equally higher acceptance rate for UCB (82%) among health professionals and patients in Switzerland.[16] We note here that the level of acceptance of UCB for transfusion before counseling in our data set was much lower (26.2%). This may have been due to the fact that Hassall *et al.* worked with women only, while Wegner *et al.* included well-informed health professional such as hematologists. The level of education seemed to be higher in our data set as 92.8% of our respondents had at least secondary education

compared to 40% in the Kenyan study. This suggests that in spite of the level of education, awareness of UCB for transfusion may have been more in the Kenyan study. Hence, increasing awareness among our respondents, by way of counseling, might have eliminated the difference.

Alexander *et al.* working with 302 pregnant women in Makurdi, (East-Central Nigeria) found that only 19% were aware of UCB donation and banking with their sources of awareness being mainly the media (39%),

Table 6: Association between respondents' sociodemographic characteristics and their willingness to accept cord blood transfusion before counselling

Sociodemographic characteristic	Willingness to accept cord blood transfusion for your child or yourself-before counselling		χ^2	P
	Yes	No		
Age of respondent (years) (*n*=523)				
≤20	6 (23.1)	20 (76.9)	2.503	0.644
21-30	65 (25.1)	194 (74.9)		
31-40	54 (29.2)	131 (70.8)		
41-50	3 (16.7)	15 (83.3)		
≥50	11 (31.4	24 (68.6)		
Gender (*n*=532)				
Male	35 (28.7)	87 (71.3)	0.538	0.463
Female	104 (25.4)	306 (74.6)		
Occupation (*n*=523)				
Professionals	24 (31.2)	53 (68.8)	2.949	0.815
Traders	46 (25.4)	135 (74.6)		
Artisans	12 (23.1)	40 (76.9)		
Civil servants	13 (24.1)	41 (75.9)		
Students	24 (24.5)	40 (70.2)		
Unemployed	17 (29.8)	74 (75.5)		
Clergy	2 (50.0)	2 (50.0)		
Average family income (*n*=453)				
<50,000	64 (27.4)	170 (72.6)	0.078	0.994
50,000-100,000	37 (27.4)	98 (72.6)		
>100,000-200,000	15 (26.8)	41 (73.2)		
>300,000	7 (25.0)	21 (75.0)		
Religion (*n*=529)				
Orthodox	95 (28.3)	241 (71.7)	12.254	0.031*
Pentecostal	37 (23.9)	118 (76.1)		
Jehovah's Witnesses	0 (0.0)	1 (100.0)		
Non-orthodox, Non- Pentecostal	4 (13.3)	26 (86.7)		
Islam	4 (80.0)	1 (20.0)		
Pagan	0 (0.0)	2 (100.0)		
Marital status (*n*=532)				
Married	119 (25.9)	341 (74.1)	0.349	0.555
Single	21 (29.2)	51 (70.8)		
Level of education (*n*=526)				
Primary	7 (18.4)	31 (81.6)	1.525	0.467
Secondary	60 (25.5)	175 (74.5)		
Tertiary	70 (27.7)	183 (72.3)		
Number of children (*n*=534)				
None	46 (24.5)	142 (75.5)	1.893	0.595
1-3	72 (27.6)	189 (72.4)		
4-6	21 (27.6)	55 (72.4)		
≥7	1 (11.1)	8 (88.9)		

χ^2=Chi-squared test statistic, *P<0.05

hospital (30.2%), and friends (24%).[17] The above lines of evidence all agree that knowledge and acceptance of UCB especially for transfusion are limited in our clime; however, our evidence suggests that improving awareness seems to ameliorate this problem.

Bazuaye and Awodu working with 125 SCD patients, in Benin, (South-South of Nigeria) to ascertain their knowledge and acceptance of UCB as an alternative to adult blood transfusion, found that no respondent in his data set knew that UCB could be used as an alternative to allogeneic blood transfusion, 58.8% were willing to accept UCB for transfusion and the main reason for unwillingness was the fear of medical complications.[18] However, among our own SCD patients or their parents, 100% were willing to accept this intervention if it could cure SCD.

Among our respondents, sociodemographic characteristics influenced their knowledge of UCB.

Even after multivariate analysis, education of at least secondary school level and average monthly income were still significantly associated with knowledge about UCB. Before counseling, religion, seemed to significantly influence the attitude of our respondents to acceptance of UCB for transfusion $P = 0.031$. This changed in favor of occupation $P = 0.025$ [Tables 6 and 7] after counseling. Even though the above influence was attenuated on multivariate analysis, this seems to suggest that awareness may be able to change the religious views concerning

UCB for transfusion in our clime. Hassall *et al.* found that knowledge and attitude of UCB transfusion were not influenced by any sociodemographic characteristic of their respondents.[15] It is not surprising that our results contrast with this because as noted above the level of awareness of UCB and its use for transfusion seemed to be more in their data set.

Before counseling 16.4% of our data set would not accept UCB for transfusion because they considered it dirty and

Table 7: Association between respondents' sociodemographic characteristics and their willingness to accept cord blood transfusion after counselling

Sociodemographic characteristic	Willingness to accept cord blood transfusion for your child or yourself- after counselling		χ^2	P
	Yes	**No**		
Age of respondent (years) (*n*=511)				
≤20	20 (83.3)	4 (16.7)	6.529	0.163
21-30	182 (71.4)	73 (28.6)		
31-40	124 (69.3)	55 (30.7)		
41-50	11 (61.1)	7 (38.9)		
≥50	30 (85.7)	5 (14.3)		
Gender (*n*=520)				
Male	96 (78.7)	26 (21.3)	4.002	0.045
Female	276 (69.3)	122 (30.7)		
Occupation (*n*=511)				
Professionals	62 (83.8)	12 (16.2)	14.480	0.025*
Traders	118 (66.7)	59 (33.3)		
Artisans	31 (60.8)	20 (39.2)		
Civil servants	41 (74.5)	14 (25.5)		
Students	71 (75.5)	23 (24.5)		
Unemployed	40 (71.4)	16 (28.6)		
Clergy	4 (100.0)	0 (0.0)		
Average family income (*n*=444)				
<50,000	158 (69.3)	70 (30.7)	3.248	0.355
50,000-100,000	102 (76.7)	31 (23.3)		
>100,000-200,000	42 (77.8)	12 (22.2)		
>300,000	22 (75.9)	7 (24.1)		
Religion (*n*=517)				
Orthodox	240 (72.5)	91 (27.5)	6.710	0.267
Pentecostal	108 (73.0)	40 (27.0)		
Jehovah's Witnesses	0 (0.0)	1 (100.0)		
Islam	4 (80.0)	1 (20.0)		
Non-orthodox, Non- Pentecostal	17 (56.7)	13 (43.3)		
Pagan	1 (50.0)	1 (50.0)		
Marital status (*n*=520)				
Married	314 (69.9)	135 (30.1)	3.211	0.073
Single	57 (80.3)	14 (19.7)		
Level of education (*n*=526)				
Primary	28 (73.7)	10 (26.3)	5.936	0.051
Secondary	150 (65.8)	78 (34.2)		
Tertiary	188 (75.8)	60 (24.2)		
Number of children (*n*=522)				
None	137 (76.1)	43 (23.9)	3.016	0.389
1-3	177 (68.9)	80 (31.1)		
4-6	53 (69.7)	23 (30.3)		
≥7	6 (66.7)	3 (33.3)		

χ^2=Chi-squared test statistic, *P<0.05

contaminated, however, after counseling, this reduced to 3.6%; suggesting that proper sensitization and campaign especially in the antenatal period will produce results in this line.

Conclusion

Knowledge and acceptance of UCB for transfusion is limited in our clime, however evidence suggests that increasing the awareness of our population concerning the benefits of this procedure could change attitude in a positive way. We, therefore, suggest that in the media and our hospital wards and clinics especially the antenatal clinic, enlightenment campaigns on this topic should be put in place so that in due time we can take advantage of this wonderful resource that is presently being wasted.

This work is limited by the fact that it was done in just one center. Even though we believe that our sample is representative of our population, the authors would like our results to be collaborated by a multicenter study.

Conflicts of interest
There are no conflicts of interest.

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